

ABSTRACT

The present invention provides compact adsorption systems that are capable of
5 rapid temperature swings and rapid cycling. Novel methods of thermal swing adsorption
and thermally-enhanced pressure swing adsorption are also described. In some aspects of
the invention, a gas is passed through the adsorbent thus allowing heat exchangers to be
very close to all portions of the adsorbent and utilize less space. In another aspect, the
adsorption media is selectively heated, thus reducing energy costs. Methods and systems
10 for gas adsorption/desorption having improved energy efficiency with capability of short
cycle times are also described. Advantages of the invention include the ability to use
(typically) 30-100 times less adsorbent compared to conventional systems.

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